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PET User Notes

Publication of the PET User Group

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Commodore finally announced a number of new PET products which will enable PET owners to easily build a complete system.

These include: 2001-16N (16K graphics) at \$995; 2001-16B (16K business) at \$995; 2001-32N (32K graphics) at \$1195; and 2001-32B (32K business) at \$1195. All of these models include full size keyboards, but cassette is optional at \$95.

Three printer models were announced: 2021 (80 column electrostatic) at \$549; 2022 (80 column dot matrix tractor feed) at \$995; and 2023 (80 column pressure feed dot matrix) at \$849.

Additionally, two disk drive versions will be available. These are the 2040 (343K net capacity on two drives) at \$1095, and the 2041 (171.5K net on one drive) at \$595.

Delivery for all the products is supposed to begin in May (1979 I). The disk and printers will be packaged in nice metal cases in the style of the PET.

The currently available 2001-8 PET will continue to be sold in its present format. No word yet on replacement ROMs for the 8K, but the new models will have a new ROM set.

I saw a copy of the PET User Manual recently. It was printed in 8.5 x 11 format like the 6500 Programming Manual, and contained about 120 pages. I think the price is \$9.95. The chapter titles are: Welcome to Your PET Computer; Unpacking Your PET; Basic Keyboard Input; Beginning BASIC; Elementary Programming; Advanced Programming Techniques (string variables, functions, subroutines, FOR-NEXT loops, subscripted variables); PET Communication with Outside World (previously published); Machine Language Programming (most of this previously published, but does include Machine Language Monitor source code); and Errors and Diagnostics (error messages). The manual has nothing magic. It seemed to neglect graphics completely, and only mentioned PEEK and POKE in the same brief note that "Intro to Your PET" used. Never-the-less, it is obviously the best effort Commodore has made yet for PET.

6550 RAM chips are now \$18, rather than the previous \$30. They are currently available from MOS Technology Customer Service, 950 Rittenhouse Road, Norristown PA 19403. Add \$1.25 shipping per order. New PETs again are using 6550 chips.

PET repair policy has changed. Current charges are \$25 per machine plus parts cost plus \$3 shipping, or \$20 per component (like cassette drive, main logic board, video board) plus parts.

If you haven't received Machine Language Monitor and preliminary manuals and you received your PET prior to 1 October 1978, send Commodore your serial number and a photocopy of your sales slip with your request. I don't know what later purchasers receive.

Since repair prices have increased, here are several suggestions. Make sure the power connector plug fits tightly onto pins on main logic board (many machines have this problem). If they don't, remove the spring clips from the plug and bend to add more spring tension. Inspect the wires leading to the tape read/write head on occasion--since the head snaps back and forth frequently, the wires can fray and break. Both suggestions are from Commodore Customer Service. From Don Nyre, Newport Beach CA: spray something like Miller Stephenson Contact-Re-Nu into both ends of the multi-contact slide switch mounted on the cassette circuit board to prevent sticking. Mike Lundberg, Omaha NE wrote that his and several other

machines in his area experienced problems like permanent cursor loss, no keyboard control, and a screen full of garbage. The problem was caused by an oily residue under the IC's which Mike cleaned with 95% isopropyl alcohol.

Have received several suggestions and requests for product and software reviews. I'm very reluctant to get involved in this. I hope the User Notes will be primarily a forum for deriving full potential from your computer, and I think the best way to accomplish this is through exchange of hardware and software ideas at nominal cost.

I do not personally have time to review very many products, and would hate to have my purely subjective opinions construed as gospel. I would also not like to publish a rave review written by a software author's cousin, nor would I care to include a negative review by someone associated with a competitive product. If you do want reviews, however, I will print them--but would like to receive comments from more than one person using each product in case there are dissenting opinions.

The instigation to write this blurb on reviews was receipt of a letter from Sanford D. Sadowsky, Scotch Plains, NJ. Mr. Sadowsky sent a scathing indictment of Video Checkers by Compu-Quote, stating that the publicity brochure misrepresented the software package, the program played very poorly, and the package wasn't worth \$14.95.

In general, I don't think very many software products, especially games and diversions, are worth that price. There are currently a number of sources for decent software at reasonable prices. I also think it's a good idea to call or write for complete information before purchasing, and if the product does not measure up to claims, you should ask for a refund at a minimum. Additionally, shipment by UPS COD only costs 85¢ extra, and might be good protection for slow delivery. Remember, with the advent of microcomputers, there are at least another 100,000 new entrepreneurs out there.

SIGN UP FOR THE NEXT 6 ISSUES

Although late, this is the last issue of Volume 1. If you liked the User Notes, please re-subscribe. I will do another 6 issues at a minimum, and more if the interest is there. To date, less than half of you have signed up again (about 1000 out of the current 2500).

Thanks for all the encouraging letters also. I promise to try more diligently to get the notes out on time for the next issues. The primary reason for the slight price increase is to have a steady part-time person to help with typing, responses to letters, mail list maintenance, and do the "programs on tape" on a more timely basis. This should help a lot -- I'm sure I would enjoy doing the User Notes if they didn't take as much time and effort.

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Announcements

Charles LaForce, 9130 Balcon Ave, Northridge CA (213) 886-0755 is interested in talking to San Fernando Valley PET people.

Program Design, 11 Idar Court, Greenwich, Conn 06830 is offering a number of educational games for preschool to adult levels. Prices range from \$10 to \$30.

Connecticut microComputer, 150 Pocono Road, Brookfield, CT 06804 has application notes "Software Delay for Slow Carriage Return Printers Using CnC ADA 1200", and "Output Formatting".

Chuck Johnson, 17104 Via Alamos, San Lorenzo CA 94580 has 2 Atari joysticks, connectors, and a SNAKE demo program for the joysticks at \$36. I think he will also send you a nice application note he has written if you want to put the package together on your own.

Bill Maddox, 9715 Heidelberg St, San Antonio TX 78233 has a Star Trek program in which the Enterprise is matched against nine equally strong Klingon vessels. Unless the Enterprise acts, it will be sought out and destroyed by the Klingons. Three levels of difficulty -- \$4.

James Mendenhall of Competitive Software, 21650 Maple Glen Dr, Edwardsburg MI 49112 is selling a Hone Utilities tape for PET at \$9.95. All orders received by March 1979 will also include a free assortment of games.

Micro Software Systems, P O Box 1442, Woodbridge VA 22193 announced BILLBOARD, a commercially oriented display and advertising program for \$49.95. Billboard moves inch high characters across the PET screen from right to left to display your messages.

Robert Elliott Purser, P O Box 466, El Dorado CA 95623 publishes a reference list of PET, TRS-80, and Apple cassettes. The list is published quarterly at \$4.

GPA Electronics, 906 Blair Ave, Oakland CA 94611 sell an IEEE to 20ma (\$59.95) or RS-232 (\$74.95) Printer Interface with switch selectable baud rates.

Skyles Electric Works, 599 N. Matilda Ave-Suite 26, Sunnyvale CA 94068 announced 8K (\$250), 16K (\$450), and 24K (\$650) static memory units for PET. Also announced was a "Big Keyboard" for \$125 to provide full size keying in parallel to the existing keyboard.

Kenneth Ralston of Micro Systems Laboratory, 1492 Oak Grove Circle, Santa Ana CA 92705 announced an RS-232 adapter for PET with software selectable baud rates at \$51.95.

Expander Incorporated, 400 Sainte Claire Plaza, Upper St. Clair, PA 15241 has an IEEE/TTL Parallel Adapter for their Black Box Printer. The Interface is \$98, and the printer is \$396 without base and cover (\$30 extra).

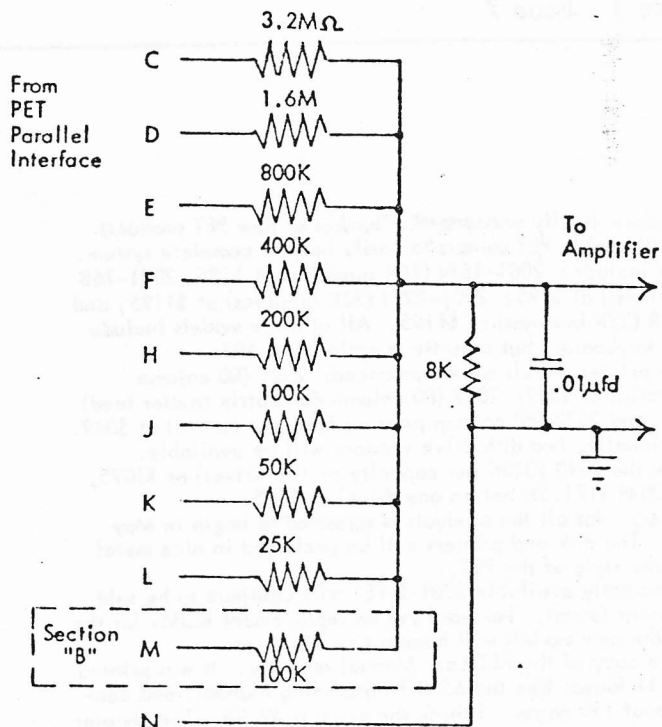
Nestar Systems, Inc, 810 Garland Dr, Palo Alto CA 94303 announced Cluster/One, a low cost distributed processing system which can connect up to 15 PETs through a high speed bus. The central machine (a PET) allows each independent processor to access disk storage and print capability.

Poor Man's D/A Converter

Jim Butterfield

Cheap, good for generating Chamberlin-style music. Precision resistors are preferred, but most anything will generate a recognizable sound.

Section B of the diagram supports the CR2 sound effects, so that one interface board covers most sound requirements.



The capacitor provides some reduction of the sampling frequency (when generating music) .. tone controls on the amplifier will also help, if available.

[ed. note: "Chamberlin-style music" is something worth listening to if you haven't heard it. For background on this, see the excellent article written by Hal Chamberlin in Sept. 1977 Byte magazine. The music is a combination of digital to analog output and 6502 software. MTU (Hal Chamberlin and David Cox) manufacture an excellent, low cost DAC board with on-board audio amplifier. They will be revising the unit in the near future to use a single 5 volt supply (currently 5 and 12 volt) which will make it easier to use with PET. Current model is MTU K-1002 at \$40.]

Programs on Tape

\$2 for the first program including cassette and postage, \$1 for each additional
-- max 4 per tape. This comes to \$5 for each 4 programs. This "programs on tape service" is priced to cover the cost of a part time person to copy and mail the tapes. If you have a program to add to the list, please send it on tape. We will copy it and return your tape (with program of your choice). Please do not send commercial programs.

SEQUENCE -- you have to sort a character list
STATECAPS -- quiz on states and capitals from Kilobaud 3/78
RACETRACK -- see listing in V. 1, Issue 3 - RE McGee
DEFLECTION -- F Dunlap
ADDITION -- math drill -- F Dunlap, C Pitcairn
OTHELLO -- from Byte 9/77
BAGELS -- like Mastermind - J Butterfield
Cash flow/Return on Investment - R Goldsmith
STAR TREK

BLACKJACK -- D Lien-nice graphics, humorous patter by dealer
LIFE 40+25 -- F Covitz
LIFE 64+64 -- F Covitz
IO-ALL -- JK Johnson from Kilobaud
TRAP -- trap the PET, avoid being trapped
SUPER MASTERMIND -- JK Marcou
LUNAR LANDER -- JK Marcou
NIM -- J Butterfield
QUBIC -- 3D Tic-Tac-Toe
LIST MEMORY -- Charles Combs
MACHINE LANGUAGE MONITOR -- loads in low memory
TIME -- large clock display
BIORYTHM -- K Finn - concise code - 30 statements
KING -- business-social simulation game
BREAKOUT -- J Butterfield - paddle ball
SWATPLOT -- F Campbell (see V.1, Issue 3) - 80x50 plot
TYPEWRITER -- M Richter, R Julin - no printer interface yet
WUMPUS - hunt the wumpus
MARKET -- corporate simulation
CONCENTRATION -- Francis Chambers - displays 52 cards
ESP TEST -- Francis Chambers - test your ESP powers

SHARK BAIT -- JK Johnson - hangman style program
FLEA RACE -- JK Johnson
AWARI -- Hans-J Koch - German instructions - nice graphics
CHASE with Sound
STAR LANES -- Gerald Hasty - from Interface Age future-world
business simulation
KALEIDOSCOPE -- Jerry Panofsky - People's Computers
HEXDEC -- Wayne Reindollar - converts and pokes values into
memory for machine language programs
24 Second QURIC -- Mike Louder
DOODLER -- Jim Brannan - draw type program
GNIP GNOP -- Jim Brannan - 2 player ping pong
PONG -- People's Computers
CURFIT -- J Butterfield - fits data to 6 curves
TRIANGLE -- J Butterfield - solves any triangle
METRIC -- J Butterfield - does metric conversions
DAYS -- J Butterfield - day of week, days between
TRENDLINE -- J Butterfield - fits, forecasts, graphs
MILEAGE -- J Butterfield - distances from Latitude/Longitude
FACTORS -- J Butterfield - prime factors for any number
MORTGAGE -- J Butterfield - schedule of payments
FINANCE -- J Butterfield - present, future value etc.
ADDER -- Earl Wuchter - PET as printing adder (nicely done)
BATTLESHIPS -- J Butterfield - you vs. computer
MOONLANDER -- J Butterfield - graphics
CRYPTO -- J Butterfield - cryptogram solving aid
JOTTO -- J Butterfield - guess a word
POEMS -- J Butterfield - write poetry
MYSTERY -- J Butterfield - you can't list it!
MIKONDIS - high monitor and disassembler from SPHINX.
Modified by H. Chow
ELIZA -- adapted for PET by Dennis Cumberton - the computer
psychologist
HAMKURABI -- social simulation
SLOT MACHINE -- Michael Richter
CRAPS -- Michael Richter
BREAKOUT with Sound
POP SHOT -- from SPHINX - shooting gallery with sound
STARS -- John Broonhall - children's number guessing game
LINEQN -- Frank Alexander - solves linear equations using
matrix invert subroutine.
POUNCE -- John Broonhall - kids game. If you don't pounce the
right number of spaces, the mouse might run into his hole.
STAR WARS -- John Broonhall
AUTO-DOODLE -- Frank Levinson - draws very nice rectangular
patterns
FOURIER -- Frank Levinson - very nice high density graphing -
visual demo of Fourier approximation curve fit.
CRAPS2 -- Earl Wuchter - not a crap game; rolls dice & displays
statistics on the rolls. Shows odds, displays dice.
DRAW POKER -- Earl Wuchter
SOLITAIRE POKER -- D Howe - submitted by E Herstein - solitaire
version of draw poker. Displays odds as you play.
PRO FOOTBALL -- Modified by Carl Hennig from SRI Library
RENUMBER -- Bill Seiler - machine language version
MATCH GAME -- L Uher - 23 matches
STAR TREK IV -- Francis Chambers - updated version with good
graphics and more features
BRAIN STRAIN -- Ed Herstein - try to get lights on in all but
the center square
SNAKE -- submitted by Ed Herstein - a 0,1, or 2 player Trap
game that speeds up the longer you go.
YAHTZEE -- Pete Rowe submitted by Ed Herstein - dice game
HANGMAN -- Grant Paul - has list of 500 words
HANGMAN 2 -- for 2 players with PET keeping score - needs a
little work on display & graphics.
TAPE TEST -- Bob Huenemann - Help to evaluate tape errors.
COPY -- R Julin - data file manipulation
TALK & TALKER -- R Julin - Send ASCII characters between 2
PETs via parallel user port.
LEM -- submitted by Horst Brinkler - lunar lander includes
attitude angle and orbit consideration as well as time,
altitude, & velocity. English or metric measurements. No
graphics.
INDEX -- David Wilcox - tape index to locate a specific
program on a tape.
KENTUCKY DERBY -- Tom Baker - Horse race for any number of
people with betting - good looking horses.

MAZE -- Hans-J Koch - Creates a single solution maze up to
19*10. Use cursor keys to find way through.
FLIGHT SIMULATOR - submitted by Jerry Panofsky - instrument
flying. Try to take off and land safely.
BACKGAMMON -- Bill Hood
PPONG -- P. Rowe submitted by Ed Herstein - similar to
deflection with land mines
FM MACHINE -- P. Rowe submitted by Ed Herstein - feed numbers
through machine, see output, deduce function.
WEIGH - Guess the lightest and heaviest object in 3 tries. -
KLINGON CAPTURE -- Mark Turner - grid game from KILOBAUD
SIMON -- Gary Mayhuk - sound repetition game -
OTHELLO/2 -- F. Dunlap Modified by J Hendenhall
DIGIT SPAN -- number recall in sequence and reverse sequence
for progressively long numbers
CENTRAL LIMIT -- Dave Heise - graphs results of repeated
samples of any given size, showing averages tend to be
normally distributed.
CHI SQUARE -- Dave Heise - constructs repeated random 4-fold
tables and computes significance test for each. Nice
graphic representation of statistical values.
MONEY CHANGER -- Max Yoder - give correct change for amount
shown. Basis of a good educational program. No graphics.
BABY -- Sally & Stan Klein - try to keep your sanity while
feeding & diapering your baby yet have time to yourself
SAM--R Tansony - shoot down enemy planes from your missile base
CHECKERS -- William Anderson
PET ORGAN -- Wm. Anderson - Sound plays 3 octaves of notes
STARWAR -- John Ball - save planet from enemy fighter planes.
10 levels of difficulty.
LONG DIVISION -- E Lichten - long division tutorial by grade
level
NEAT PROGRAM -- Chris Crawford
TANKS -- E Lichten - shoot Russian tanks which are faster &
able to move through the mine fields
FAIR OPTION VALUE -- Joe Kot - Evaluates stock option prices.
TRACE -- Brett Butler - traces basic program or direct entries
KEYBOARD -- Neil Harris/J Butterfield - musical keyboard,
will remember and play back tune
MARKS -- J Butterfield - keeps track of names and grades,
shows low, high, and average. Keeps tape file
PORTFOLIO -- J Butterfield - keeps track of stocks. Buy,
sell, evaluate, and save on tape.
MERGE -- J Russo/H Chow - merge two or more program segments
M7171 -- J Russo/H Chow - high monitor with merge capability
IMAGE -- P Rowe, modified by H Chow - save any portion of
memory on cassette

Star Sounds -- CB2 Sound

Rick Church
Helena, MT.

10 POKE 59467,16
20 POKE 59466,15
30 A=1
40 FOR T =1 TO 20
50 FOR X=255 TO 100 STEP -A
60 POKE 59464,X
70 NEXT X: NEXT T
80 A=A+1: GOTO 40

10 POKE 59467,16
20 POKE 59466,15
30 A=255
40 FOR X=A-4 TO A
50 POKE 59464,X
60 NEXT X
70 IF A<5 THEN END
80 A=A-1: GOTO 40

Two Player Games with One Keyboard

by Michael Riley, Philadelphia

Under normal operation, two player games on the PET are limited by key lock out - that is, when one key is held down, the other keys are locked out.

Games that need a limited number of keys can be played with the help of K=PEEK(59410). Normally, 59410 contains 255. When any of the keys "rvs", "[", "spc", "<", ".", or "-" are depressed, certain bits will be reset. These bits are 1,2,4,8,64, and 128 respectively.

Games involving more than a few keys require a machine language routine, however. To do this, first set the interrupt disable. Then add 240 [\$F0] to the row number of the key that you want to sense. Store the sum in E810. Then look to see what is in E812. E812 will contain the values of the column number bits. If the value of the column number bit is 0 (reset or off), then the key is being held down. (see keyboard chart accompanying article)

The following program stores the number 240 through 249 in E810 and transfers the results of E812 to the first 10 bytes on the screen. The purpose of the program is to demonstrate graphically how keys can be sensed.

You may wish to write your own routine or simply change this one so that the ten information bytes are stored somewhere other than on the screen. They can then be PEEKed with a simple BASIC command and "ANDed" with the proper bits in order to reveal the location of keys that are being held down simultaneously.

```
033A 78      SETI
033B A0 F0    LDY #$F0
033D A2 00    LDX #$00
033F 8C 10 E8 STY $E810
0342 AD 12 E8 LDA $E812
0345 9D 00 80 STA $8000,X
0348 E8      INX
0349 C8      INY
034A E0 0A    CPX #$0A
034C D0 F1    BNE $033F
034E 58      CLI
034F 60      RTS

100 FORX=826TO847:READR:POKEX,R:NEXTX
110 SYS826
120 PRINT"dddd"
130 GOTO110
826 DATA120,160,240,162,0,140,16,232
830 DATA173,18,232,157,0,128,232
841 DATA200,224,10,208,241,88,96
```

GET String Routine

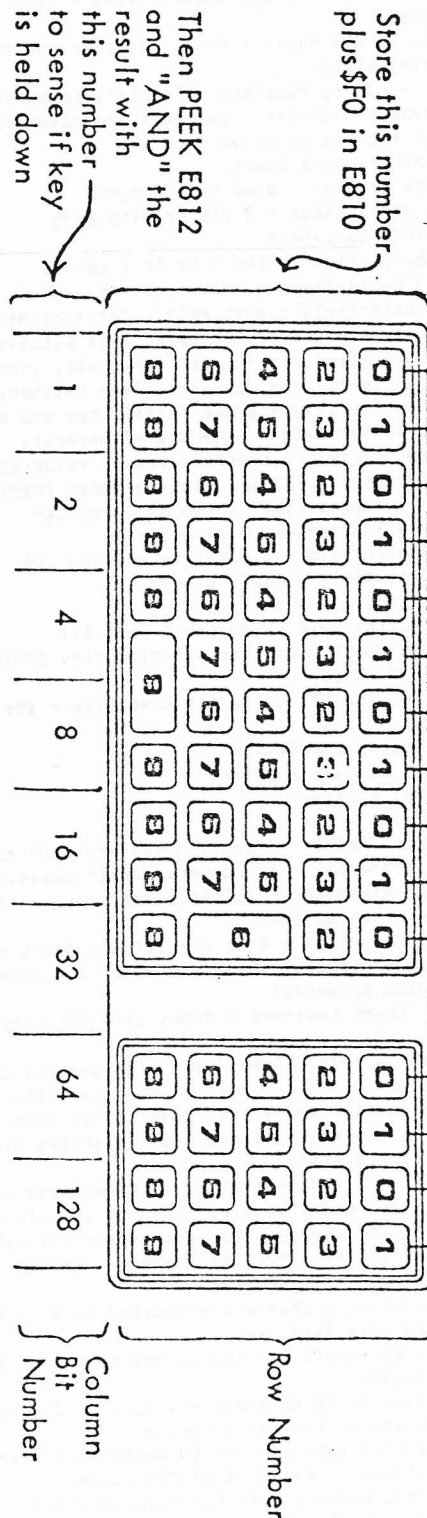
John Bell McLean, VA

This routine acts as a substitute for an INPUT statement and it allows commas, semicolons, colons, etc. to be used, which cannot be used in INPUT.

```
10 0$="" 40 blanks
2500 REM GET STR ROUTINE
2505 Z$="":B$="" :X$=""
2510 A=PEEK(245)+1
2515 IF A>21 THEN PRINT "ddd":A=A-3
2516 POKE 245,A:PRINT "u":B$
2520 GET X$: IF X$="" THEN 2520
2530 IF X$=CHR$(13) THEN PRINT:RETURN
2535 IFASC(X$)<160ANDASC(X$)>96ORASC(X$)<30THENZ$=LEFT$(Z$,LEN(Z$)-1):GOTO2555
2540 Z$=Z$+X$
2555 POKE 245,A:PRINT"u":B$:Z$:GOTO 2520
3000 REM
3100 PRINT " ucursor up; d=cursor down"
```

Note: Line 2535 makes the cursor controls and delete key list character entered.

Line 2515 allows room at the bottom of the screen for two lines without scrolling during entry.



Verifying Tape Loads

By Jim Butterfield Toronto

When you get a bad cassette tape load, PET says ?LOAD ERROR. So if you don't get the error message, just READY, that means your tape read is good, right?

Wrong. For unknown reasons, PET only warns of certain kinds of errors. As many users know by now, you can get a bad load with no warning from PET.

To check for a good load, just type ? ST after the load is complete. A reply of 0 (zero) means the load is OK. A reply of any other means a bad load.

SOFTWARE for PET

TUNNEL VISION and KAT & MOUSE \$7.95
Two excellent maze programs. In Tunnel Vision, you view the maze from inside in perspective. If you get lost in attempting to reach the exit, the program provides you a map showing the trail. In Kat & Mouse, you must find your way through the maze before the hungry Kat finds you. Each maze has only one solution, and each is unique.

KITE FIGHT & SIMON \$7.95
Kites is a completely original two player action game with its own unique strategies. Includes 4 pages on real Indian Fighter Kites.
In Simon, you must repeat what you see and hear.
Simon is a fun game with great graphics and sound.

All by Michael Riley

LUNAR LANDER - The most sophisticated lander available with auto-pilot in case of pilot errors. Includes sound on descent and the Star Spangled Banner upon a successful landing.
By Jeff Jessee and Bob Freeman.

MORSE CODE - Learn morse code painlessly. Morse Code will sound out any letter you key in, or it will give the sounds for code recognition practice. By Bob Freeman

BOTH FOR \$9.95

MICROCHESS by Peter Jennings \$17.95
Offers 8 levels of play to suit everyone from beginner to the serious player. It examines as many as 6 moves ahead.

BRIDGE CHALLENGER \$13.45
You and the dummy play 4 person Contract Bridge against the PET. The program deals hands according to your criterion for high card points. You can review tricks, swap sides, or replay cards after each hand.

STIMULATING SIMULATIONS \$13.45
Dr. CW Engels' book of 10 interesting simulation games with complete documentation, instructions, and suggestions for modification and enhancement. Includes cassette with programs keyed in for you.

GRAPHICS UTILITY PACKAGE \$13.45

All From Personal Software

ABTAPE1 \$8.00
Includes Life, Biorythm, Othello, Mastermind II, Multiprimer (math tutorial-deduction game), and Capture

CmC Word Processor \$24.95
The best available word processing software for the PET

BOOKS books BOOKS books BOOKS

BASIC for Home Computers - Albrecht, Finkel, Brown \$5.95
New programmed instruction text on MICROSOFT BASIC

BASIC and the Personal Computer - Dwyer & Critchfield \$12.95

Stimulating Simulations - Dr. C. William Engel \$4.00

Programming a Micromputer:6502 - Caxton Foster \$8.95

My Computer Likes Me *when I speak BASIC - B Albrecht \$2.00

6500 Programming Manual - MOS Technology \$6.50

6500 Hardware Manual - MOS Technology \$6.50

Hewlett-Packard IEEE-488 Standards Manual \$1.50

Instant BASIC - Jerald R. Brown \$6.00

How to Profit From Your Personal Computer \$7.00
- TG Lewis

ACCESSORIES

Cassette Tapes

- Premium quality high output, low noise in 5 screw housings
- C-10 (5 min/side) 10/\$6.25 50/\$27 100/\$52
- C-30 (15 min/side) 10/\$8.00 50/\$36 100/\$67
- Certified Digital Cassette Tape 300 foot (C-64) 10/\$19.50
- In digital 5 screw housing with slide write protect tabs, with Norelco box

Soft plastic boxes 10/\$1.00
Norelco-style hard plastic two piece hinged box 10/\$1.25

PET Edge Connector Plugs with Keys

- Second Cassette Port \$1.75
- User or IEEE-488 Port \$2.50
- Memory Port \$4.95

Protect-A-PET \$9.95
Custom fitted clear vinyl dust cover with quality stitched seams for those rare occasions when you're away from your PET

BETSI PET to S-100 Interface Motherboard \$149
Four slot motherboard - On board sockets and decoding circuitry hardware with four 100 pin edge connectors. Assembled.

BETSI Kit - one S-100 connector \$119

Power Supply for BETSI and static RAM boards \$34
8 volt/6 amp. Assembled in case

S-100 8K Static RAM (Problem Solver Systems) \$149
Assembled, tested, and burned-in at factory
120 day warranty PERFECT FOR BETSI

S-100 16K Static RAM (Problem Solver Systems) \$295

PET IEEE to Printer Interface by GPA Electronics
Assembled and tested -- includes an additional connector, thus leaves bus open for additional peripherals.

- 20 ma \$59.95
- RS-232 \$74.95

KIM-1 \$161
SYM \$238

Write for list of
PET and KIM accessories

We pay shipping on prepaid orders in excess of \$6.00. Add \$.75 for orders less than \$6.

M7171 Monitor and Merge in High Memory

Jim Russo, Henry Chow Detroit

M7171 now has the ability to load and link several BASIC programs, to allow several subroutines to be combined into one program, or to simply have more than one program resident in memory at one time.

M7171 is loaded by the BASIC command LOAD. It is started by SYS7171. When M7171 is started, it reserves the top 1K (of an 8K PET) for itself. Exit from M7171 by the command X.

When the PET loads M7171, it then considers Program Memory to be full. If you wish to type in a new BASIC program, use the NEW command to free up memory. If you wish to load a BASIC program from tape, use the BASIC command LOAD.

To load a BASIC program after the BASIC program already in memory, enter M7171 by the command SYS7171, then use L 01, or L 01,NAME to load the tape. If the tape contains a BASIC program which will fit in the remaining memory, it is loaded, and control is returned to BASIC. If the program does not fit, M7171 prints ? and refuses to load it. If the tape contains a machine-language program, M7171 loads it normally and retains control.

If you wish to combine several BASIC routines into one program, the line numbers of the sections should not overlap each other; and the lowest-numbered section should be loaded first. If you violate this rule, BASIC will proceed as follows: when looking for a line number, it starts at the beginning of the program and scans forward until it finds it; if it first finds a larger line number, it assumes the one it was looking for doesn't exist. The screen editor can be used to re-order the program, but since the screen editor is subject to the same restriction in finding lines, you will need to experiment for awhile to get down the techniques of editing an out-of-order program.

If your program stops with an out-of-memory error, you may free the 1K used by M7171 by giving the BASIC command POKE 135,32.

One application of these techniques is the use of the RESEQUENCER program (D63777-R63888) to resequence a program already in memory. If M7171 was not already in memory, the pointers for the existing program can be read by the command ?PEEK(124);PEEK(125). Then load M7171 and use POKE 124, ;POKE 125, to restore the pointers. Use M7171 to load RESEQUENCER, and then start it by the command RUN 63888. RESEQUENCER prints an * for each line, and the line numbers of any lines where the new argument of GOTO, GOSUB, or THEN has more digits than the old one, and may have overwritten the command.

1C00	EA EA EA EA EA EA EA A9	1CD0	5E 1E 90 0D A2 00 81 11
1C08	00 85 86 A9 1C 85 87 A9	1CD8	C1 11 F0 05 68 68 4C 9B
1C10	27 8D 1B 02 A9 1C 8D 1C	1CE0	1C 20 F7 1C C6 21 60 A9
1C18	02 A9 00 85 82 A9 1C 85	1CE8	1B 85 11 A9 00 85 12 A9
1C20	83 A9 43 85 21 D0 12 A9	1CF0	05 60 A9 0D 4C D2 FF E6
1C28	42 85 21 D8 4A 68 85 1E	1CF8	11 D0 06 E6 12 D0 02 E6
1C30	68 85 1D 68 85 1C 68 85	1D00	0A 60 3A 3B 52 4D 47 58
1C38	1B 68 69 FF 85 19 68 69	1D08	4C 53 1D 1D 1D 1D 1D 1D
1C40	FF 85 1A 3A 86 1F 58 20	1D10	1E 1E C1 B1 2C 5E D7 FB
1C48	F2 1C A6 21 A9 2A 20 22	1D18	9E 9E 20 50 43 20 20 53
1C50	1E A9 52 85 0D D0 29 A9	1D20	52 20 41 43 20 58 52 20
1C58	00 85 CA 85 0D 85 0A 20	1D28	59 52 20 53 50 A5 0D D0
1C60	F2 1C A9 2E 20 D2 FF A6	1D30	06 20 F2 1C 20 37 1E 20
1C68	20 E0 02 F0 04 E0 03 D0	1D38	37 1E A2 00 BD 1A 1D 20
1C70	06 20 3A 1E 20 37 1E 20	1D40	D2 FF E8 E0 13 D0 F5 20
1C78	90 1E C9 2E F0 F9 C9 20	1D48	F2 1C A2 2E A9 3B 20 22
1C80	F0 F5 A2 07 DD 02 1D D0	1D50	1E 20 37 1E 20 08 1E 20
1C88	0F A5 20 85 0E 86 20 BD	1D58	E7 1C 20 BB 1C F0 4D 20
1C90	0A 1D 48 BD 12 1D 48 60	1D60	90 1E 20 4F 1E 90 48 20
1C98	CA 10 E9 A9 3F 20 D2 FF	1D68	3F 1E 20 90 1E 20 4F 1E
1CA0	4C 57 1C 38 A5 13 E5 11	1D70	90 3D 20 3F 1E A0 00 B9
1CA8	85 0B A5 14 E5 12 A8 05	1D78	4A 1F 30 06 20 D2 FF C8
1CB0	0B 60 A5 11 85 19 A5 12	1D80	D0 F5 29 7F 20 D2 FF 20
1CB8	85 1A 60 85 21 A0 00 20	1D88	2A F3 F0 20 A6 0A D0 1C
1CC0	3A 1E B1 11 20 13 1E 20	1D90	20 A3 1C 90 17 20 F2 1C
1CC8	F7 1C C6 21 D0 F1 60 20	1D98	A2 2E A9 3A 20 22 1E 20

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```

1DA0 37 1E 20 04 1E A9 08 20 1EB8 20 CF FF C9 2C F0 55 C9
1DAB BB 1C F0 DB 4C 57 1C 4C 1ECO 0D F0 08 E0 10 F0 F1 95
1DB0 9B 1C 20 5E 1E 20 4F 1E 1EC8 23 E6 EE E8 D0 EA A5 20
1DB8 90 03 20 B2 1C 20 E7 1C 1ED0 C9 06 D0 C8 A2 00 8E 08
1DC0 D0 0A 20 5E 1E 20 4F 1E 1ED8 02 A5 F1 D0 03 4C 9B 1C
1DC8 90 E5 A9 08 B5 21 20 90 1EE0 C9 03 B0 F9 20 67 F6 20
1DD0 1E 20 CF 1C D0 F8 F0 D4 1EE8 3B F8 20 FF F3 A5 EE F0
1DD8 20 CF FF C9 0D F0 0C C9 1EF0 08 20 95 F4 D0 08 4C 9B
1DE0 20 D0 CC 20 4F 1E 90 03 1EF8 1C 20 AE F5 F0 F8 4C 6B
1DE8 20 B2 1C A6 1F 9A A5 1A 1F00 1F 20 22 F4 20 8A F8 20
1DF0 4B A5 19 4B A5 1B 4B A5 1F08 13 F9 AD 0C 02 29 10 D0
1BF8 1C A6 1D A4 1E 40 A6 1F 1F10 E5 4C 57 1C 20 4F 1E A5
1E00 9A 4C 8B C3 A2 01 D0 02 1F18 11 85 F7 A5 12 85 F8 20
1E08 A4 09 B5 10 4B B5 11 20 1F20 CF FF C9 20 F0 F9 C9 0D
1E10 13 1E 68 4B 4A 4A 4A 4A 1F28 F0 A4 C9 2C F0 03 4C 9C
1E18 20 2B 1E A8 68 29 0F 20 1F30 1E 20 4F 1E A5 11 85 E5
1E20 2B 1E 4B 8A 20 D2 FF 6B 1F38 A5 12 85 E6 A5 20 C9 06
1E28 4C D2 FF 1B 69 06 69 F0 1F40 F0 92 A2 00 20 B1 F6 4C
1E30 90 02 69 06 69 3A 60 20 1F48 57 1C 0D 20 20 20 20 20
1E38 3A 1E A9 20 4C D2 FF A2 1F50 20 20 20 20 20 30 20 20
1E40 02 B5 10 4B B5 12 95 10 1F58 31 20 20 32 20 20 33 20
1E48 6B 95 12 CA D0 F3 60 20 1F60 20 34 20 20 35 20 36
1E50 5E 1E 90 02 85 12 20 5E 1F68 20 20 B7 A5 7C 38 E9 04
1E58 1E 90 02 85 11 60 A9 00 1F70 B5 27 A5 7D E9 00 85 28
1E60 B5 0F 20 90 1E C9 20 D0 1F78 A0 00 B1 27 F0 06 E6 27
1E68 09 20 90 1E C9 20 D0 0E 1F80 D0 02 E6 28 C8 B1 F3 D0
1E70 1B 60 20 85 1E 0A 0A 0A 1F88 07 C8 B1 F3 C9 04 F0 06
1E78 0A 85 0F 20 90 1E 20 85 1F90 20 4D F6 4C 01 1F A5 28
1E80 1E 05 0F 38 60 C9 3A 08 1F98 91 F3 88 A5 27 91 F3 A0
1E88 29 0F 28 90 02 69 08 60 1FA0 03 B1 F3 18 65 27 91 F3
1E90 20 CF FF C9 0D D0 F8 68 1FA8 C8 B1 F3 65 28 E9 03 91
1E98 68 4C 57 1C 4C 9B 1C 20 1FB0 F3 C9 1C 90 03 4C 9B 1C
1EA0 90 1E A9 00 85 EE 85 FA 1FB8 20 4D F6 20 22 F4 20 8A
1EA8 A9 23 85 F9 20 5E 1E 29 1FC0 F8 20 13 F9 AD 0C 02 29
1EB0 0F B5 F1 20 90 1E A2 00 1FC8 10 F0 03 4C 9B 1C A0 AE
1FD0 20 3F F3 4C EE F3 24 24

```

D63777-R63888 (Delete and Resequene)

modifications by Jim Russo and Henry Chow

```

63777 PRINT"DELETE LINES J TO K (J,K)":INPUT J,K
63778 PRINT"J":FOR I=J TO J+8:IF I>K THEN 63780
63779 PRINT I:NEXT:PRINT"J="J+9:"K="K":GOTO 63778
63780 POKE 525,10:FOR I=0 TO 9:POKE 527+I,13:NEXT:PRINT"";END
63888 PRINT"RESEQUENCE":INPUT"FIRST, INCREMENT";Z,K
63985 DIHL(256):L=1025:DEFFNR(X)=PEEK(X)+256*PEEK(X+1)
63986 DEFFNM(X)=INT((K*X-K+Z)/256)
63987 N=FNR(L):X=FNR(L+2):IF X<63777 THEN A=A+1:L(A)=X:L=N:G
OTO 63987
63989 L=1025:FOR B=1 TO A:N=FNR(L):POKE(L+3),FNR(B)
63990 POKE(L+2),K*B-K+Z-256*FNR(B)
63991 F=0:FOR C=L+4 TO N-1:P=PEEK(C):IF P=1370R P=1410R P=167T
HEN F=1:GOTO 63999
63992 IF F>0 THEN F=0:IF P<58 THEN F=1:G=6+1:IF P>47 THEN D=10*D+P
-48:GOTO 63999
63993 IF D=0 GOTO 63999
63994 FOR E=1 TO A:IF D=L(E) GOTO 63996
63995 NEXT E:D=0:G=0:GOTO 63999
63996 D=0:E#="" *STR$(E*K-K+Z):H=LEN(E#):C=C-G:IF P<48 THE
NG=G-1:C=C+1
63997 IF H<6>G THEN PRINT B*K-K+Z;E*K-K+Z;
63998 FOR I=1 TO G:POKE C,ASC(MID$(E#,I+H-G,1)):C=C+1:NEXT I:G
=0
63999 NEXT C:L=N:PRINT"";NEXT B:END

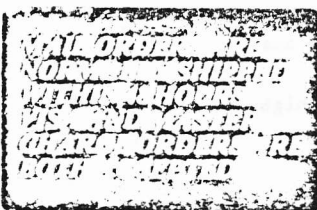
```

Ed. note: this is a modification to the previously published RESEQUENCER with line delete capability added. Henry and Jim use it in conjunction with MERGER or M7171. This version will resequence ON..GOTO with an error signal and will change the number if you leave enough spaces before the line numbers.]

You can use the versatile new BETSI to plug the more than 150 S-100 bus expansion boards directly into your PET*!

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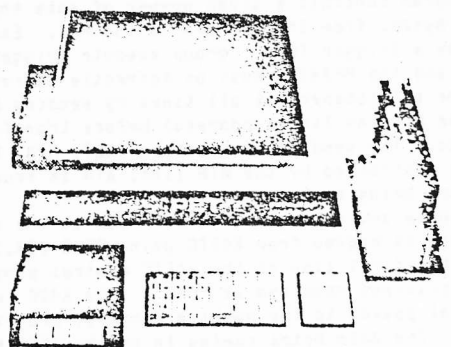


The BETSI Interface/Motherboard Kit includes all components, a 100-pin connector, and complete assembly and operating instructions for \$119.

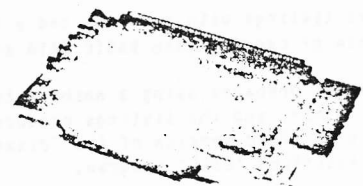
The Assembled BETSI board has four 100-pin connectors, complete operating instructions and a full 6-month Warranty for just \$165.

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BETSI is the new Interface/Motherboard from Forethought Products—the makers of KIM-1—which allows users of Commodore's PET Personal Computer to instantly work with the scores of memory and I/O boards developed for the S-100 (Imvat) Altair type bus. BETSI is available from stock on a single 5 1/2" x 10" printed circuit card.



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*PET is a Commodore product.

IEEE Bus Handshake Routine in Machine Language

John A Cooke University of Edinburgh
reprinted from Commodore PET Users Club
Newsletter, England

To use the IEEE-488 bus on the PET at maximum speed it is necessary to use machine language rather than BASIC 'INPUT' and 'PRINT'. The routine given here has been used with an HP3437A systems voltmeter to reach data transfer speeds of over 5000 bytes per second, corresponding to 2500 voltage readings in 2-byte packed binary format or 625 readings in 8-byte ASCII format. The best speed attained in BASIC is 75 readings per second transferred as character strings.

The IEEE Bus

Details of the IEEE-488 bus are given in PET documentation, but some clarification of the register addresses is helpful. These are:

HEX	DECIMAL	BITS	IEEE	DIRECTION
E820	59424	0-7	DIO 1-8	from bus
E822	59426	0-7	DIO 1-8	to bus; 'PET' controlled
E821	59425	3	NDAC	'PET' controlled
E823	59427	3	DAV	'PET' controlled
E840	59456	0	NDAC	from bus
		1	NRFD	'PET' controlled
		2	ATN	'PET' controlled
		6	NRFD	from bus
		7	DAV	from bus

Note that on the IEEE bus, 'high' is logic false and 'low' is logic true; and that the data bus must be left with all bits 'high' when PET has finished to avoid confusion of data put to the bus by other devices.

The Program

The program controls a given number of data transfers, each of 8 bytes, from the HP3437A to the PET. Each one is preceded by a trigger (GET - group execute trigger) on the IEEE bus, and the HP3437A must be correctly addressed as a 'talker' or a 'listener' at all times by sending MTA (my talk address) or MLA (my listen address) before transfers as appropriate. The sending of messages (GET, MTA, MLA, etc.) or data is controlled by the ATN line; ATN is true when messages are being sent.

The program and returned data are held in the top 2K of memory; this is hidden from BASIC using POKE 134,255: POKE 135,23 as the first line of the BASIC control program. The number of readings required is POKE'd into 6400 (decimal), then control passed to the machine language program by SYS(6144). The data bytes coming in on the IEEE bus are stored in locations 6401 (decimal) onwards; these are PEEKed out on return to BASIC, and converted into numbers using the function VAL. As the index register is used for counting, only 256 bytes can be transferred using this program, but it would be easy to modify the program to perform more transfers.

Disassembled listings with comments and a separate listing (for ease of copying into BASIC DATA statements!) are given.

This program was prepared using a machine language handler written by the author, and the listings produced by this handler and by a modified version of the 'disassemble' part of the PETSOFT ASSEMBLER 'EXEC' program.

IEEE bus handshake routine - main program

```
1800 A200 LDX #00    prepare index register
1802 A9FB LDA #FB    set ATN low
1804 2D40E8 AND E840
1807 8D40E8 STA E840
180A A928 LDA #28    MLA (28 for this device)
180C 8501 STA 01
```

```
180E 208018 JSR 1880    handshake into bus
1811 A908 LDA #08      GET
1813 8501 STA 01
1815 208018 JSR 1880    handshake
1818 A948 LDA #48      MTA
181A 8501 STA 01
181C 208018 JSR 1880    handshake
181F A9FD LDA #FD      set NRFD low (ready to receive data)
1821 2D40E8 AND E840
1824 8D40E8 STA E840
1827 A9F7 LDA #F7      and NDAC low also
1829 2D21E8 AND E821
182C 8D21E8 STA E821
182F A904 LDA #04      set ATN high
1831 0D40E8 ORA E840
1834 8D40E8 STA E840
1837 A008 LDY #08      ready to count 8 bytes
1839 208018 JSR 1880    handshake data from bus
183C A502 LDA 02        result to A
183E 9D0119 STA 1901,X  store in 1901+X
1841 E8      INX
1842 88      DEY
1843 D0F4 BNE 1839      jump if Y not zero
1845 A9FB LDA #FB      set ATN low
1847 2D40E8 AND E840
184A 8D40E8 STA E840
184D A902 LDA #02      set NRFD high
184F 0D40E8 ORA E840
1852 8D40E8 STA E840
1855 A908 LDA #08      set NDAC high
1857 0D21E8 ORA E821
185A 8D21E8 STA E821
185D A95F LDA #5F      UNT
185F 8501 STA 01
1861 208018 JSR 1880    handshake to bus
1864 A904 LDA #04      set ATN high
1866 0D40E8 ORA E840
1869 8D40E8 STA E840
186C CE0019 DEC 1900    decrease counter
186F D091 BNE 1802      jump if not zero
1871 60      RTS        return to BASIC program
```

subroutine to handle handshake into bus

```
1880 AD40E8 LDA E840    NRFD ?
1883 2940 AND #40
1885 F0F9 BEQ 1880      jump back if not ready
1887 A501 LDA 01        ready: get data byte
1889 49FF EOR #FF      complement it
188B 8D22E8 STA E822    send to bus
188E A9F7 LDA #F7      set DAV low
1890 2D23E8 AND E823
1893 8D23E8 STA E823
1896 AD40E8 LDA E840    NDAC ?
1899 2901 AND #01
189B F0F9 BEQ 1896      jump back if not accepted
189D A908 LDA #08      accepted; set DAV high
189F 0D23E8 ORA E823
18A2 8D23E8 STA E823
18A5 A9FF LDA #FF      255 into bus
18A7 8D22E8 STA E822    10
18AA 60      RTS        return to main
```

subroutine to handle handshake from bus

```
18B0 A902 LDA #02      set NRFD high
18B2 0D40E8 ORA E840
18B5 8D40E8 STA E840
18B8 AD40E8 LDA E840    DAV ?
18BB 2980 AND #80
18BD D0F9 BNE 18B8      jump back if not valid
18BF AD20E8 LDA E820    get data byte from bus
18C2 49FF EOR #FF      complement
18C4 8502 STA 02        store in $ 0002
```



```

18C6 A9FD LDA #FD      set NRFD low
18C8 2D40E8 AND E840
18CB 8D40E8 STA E840
18CE A908 LDA #08      set NDAC high
18D0 0D21E8 ORA E821
18D3 8D21E8 STA E821
18D6 AD40E8 LDA E840    DAV high ?
18D9 2980 AND #80
18DB F0F9 BEQ 18D6      jump back if not
18DD A9F7 LDA #F7      set NDAC low
18DF 2D21E8 AND E821
18E2 8D21E8 STA E821
18E5 A9FF LDA #FF      255 into bus
18E7 8D22E8 STA E822    10
18EA 60 RTS             return to main

```

IEEE bus handshake routine listing

```

1800 A2 00 A9 FB 2D 40 E8 8D
1808 40 E8 A9 28 85 01 20 80
1810 18 A9 08 85 01 20 80 18
1818 A9 48 85 01 20 80 18 A9
1820 FD 2D 40 E8 8D 40 E8 A9
1828 F7 2D 21 E8 8D 21 E8 A9
1830 04 0D 40 E8 8D 40 E8 A0
1838 08 20 B0 18 A5 02 9D 01
1840 19 E8 88 D0 F4 A9 FB 2D
1848 40 E8 8D 40 E8 A9 02 0D
1850 40 E8 8D 40 E8 A9 08 0D
1858 21 E8 8D 21 E8 A9 5F 85
1860 01 20 80 18 A9 04 0D 40
1868 E8 8D 40 E8 CE 00 19 D0
1870 91 60 EA EA EA EA EA EA
1878 EA EA EA EA EA EA EA EA
1880 AD 40 E8 29 40 F0 F9 A5
1888 01 49 FF 8D 22 E8 A9 F7
1890 2D 23 E8 8D 23 E8 AD 40
1898 E8 29 01 F0 F9 A9 08 0D
18A0 23 E8 8D 23 E8 A9 FF 8D
18A8 22 E8 60 EA EA EA EA EA
18B0 A9 02 0D 40 E8 8D 40 E8
18B8 AD 40 E8 29 80 D0 F9 AD
18C0 20 E8 49 FF 85 02 A9 FD
18C8 2D 40 E8 8D 40 E8 A9 08
18D0 0D 21 E8 8D 21 E8 AD 40
18D8 E8 29 80 F0 F9 A9 F7 2D
18E0 21 E8 8D 21 E8 A9 FF 8D
18E8 22 E8 60

```

0001 data to go into bus
0002 data from bus

1900 counter for number of data transfers

1901 start of results area

Getting Started in Machine Language

by Michael Riley, Philadelphia

The '6500 Programming Manual' has all the necessary information for programming the 6502. If you've never done machine language programming, however, you may wish to try 'Programming a Microcomputer: 6502'. This book contains most of the material in the manual, but is written more for beginners. 'The First Book of KIM' contains many game programs such as 'Lunar Lander' as well as some utility programs like 'Relocate'. The last page of this book has an excellent chart that makes finding of codes a breeze.

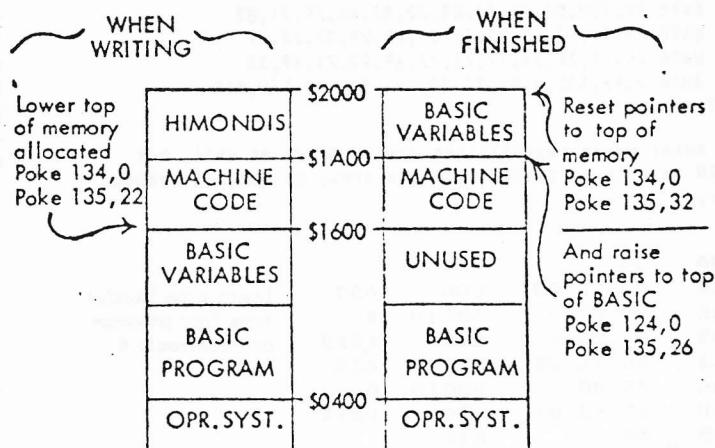
I have found that programming is much easier if I write first in BASIC to test the logic and then translate it one section at a time into machine code. A memory map of the ROM helps me to avoid writing routines that are already available.

A version of the Machine Language Monitor called 'HIMONDIS' (monitor and disassembler in high memory) is very helpful. Because it is in high memory, it can coexist with a BASIC program. The disassembler makes debugging much easier.

When writing a program, the pointers at 134 and 135 (\$86 and \$87 -- low byte first) are typically changed to point to a spot just below the machine language code.. This tells BASIC that it must store its variables below this point.

After the program is completed, you can restore these pointers so they point to the top of memory, while at the same time, raising the pointers which indicate the top of your BASIC program (124 and 125, or \$76 and \$77). This will cause your program to store its variables where HIMONDIS used to be, and allow you to save and load the entire program with a single SAVE or LOAD command.

[ed. note: 6500 Programming Manual is from Commodore/HQS Technology; Programming a Micro: 6502 is Addison-Wesley; and First Book of KIM is from Hayden.]



User Defined Functions

Joseph Patriarca

Modulus or Residue function. Result=A mod (M) or result is the remainder after A is divided by M. Note: M is a reserved variable and must be defined before the function is used.

```
DEF FNA(A)=A-ABS(M)*INT(A/ABS(M))
```

Result of residue always positive

To generate random numbers having a normal distribution with mean 0 and a deviation of 1 use:

```
FNN(x)=SQR(-2*LOG(RND(X)))*COS(2*pi*RND(X))
```

Inverse sine and cosines:

```
DEF FNS(x)=ATN(X/SQR(1-X*X))-(1-ABS(x))*1E-30)
DEF FNE(x)=ATN(SQR(1-X*X)/(X-(0-X)*1E-30))
```

Hyperbolic functions:

```
DEF FNS(H)=(EXP(H)-EXP(-H))/2
DEF FNC(H)=(EXP(H)+EXP(-H))/2
DEF FNT(H)=FNS(H)/FNC(H)
or =(EXP(H)-EXP(-H))/(EXP(H)+EXP(-H))
```

Inverse hyperbolic functions:

```
DEF FNS(HI)=LOG(HI+SQR(HI*HI+1))
DEF FNC(HI)=LOG(HI+SQR(HI*HI-1))
DEF FNI(HI)=0.5*LOG((1+HI)/(1-HI+(HI-1)*1E-30))
```

Log(10) X:

```
DEF FNL(X)=LOG*0.434294482
```

N!(factorial):

```
DEF FNF(N)=N*N*EXP(-N)*SQR(2*pi*N)
or more accurate:
DEF FNF(N)=N*N*SQR(2*pi*N)*EXP(1/(12*N)*(1-1/(30*N*N))-N)
```

Merger

Jim Russo and Henry Chow, Detroit

Load and run MERGER. Now load the first program that is to be merged. This program must have the lowest line numbers. Each program that is to be merged must have self-contained unique numbers. After the first program is loaded, use SYS826. Load the next program that is to be merged. Use RESEQUENCER to correctly position all line numbers beforehand if it is necessary. When the PET responds that the program is found, STOP the loading process with STOP key as soon as the title of the program is found. Use SYS844, and when the tape stops the two programs will be merged.

If another program is to be merged, use SYS826 and repeat the sequence.

In case of problems, check to be sure that the first program to be merged has its RAM location 124 and 125 (dec.) equal to the actual end of the BASIC program. If it isn't, the locations must be POKED to RAM location after the occurrence of the first three 00's (end of program).

```
89 A=826:FORI=1TO192:READBZ:POKEA,BZ:A=A+1:NEXT:END
90 DATA 56,173,125,2,233,4,141,242,3,173,126,2
100 DATA 233,0,141,243,3,96,173,242,3,141,123,2
110 DATA 173,243,3,141,124,2,56,173,125,2,234,234
120 DATA 168,173,126,2,233,4,170,152,24,109,242,3
130 DATA 141,125,2,138,109,243,3,141,126,2,56,173
140 DATA 125,2,237,134,0,173,126,2,237,135,0,16
150 DATA 13,32,77,246,32,34,244,32,138,248,32,238
160 DATA 243,0,169,206,160,3,32,39,202,0,96,83
170 DATA 32,84,79,79,32,84,79,32,77,69,82,71
180 DATA 69,32,0,96,11,137,150,137,10,130,130,2
190 DATA 56,173,125,2,237,134,0,173,126,2,237,135,0,48
200 DATA 5,32,77,246,96,169,134,160,3,32,3,32
210 DATA 39,202,84,72,73,83,32,80,82,79,71,82
220 DATA 65,77,32,65,83,32,84,79,79,32,76,79
230 DATA 78,71,32,84,79,32,77,69,82,71,69,32
240 DATA 0,96,135,5,92,94,98,126,39,116,230,118
READY.
```

[ed. note: merge capabilities are in M7171 as well, but MERGER resides in second cassette area, so doesn't reduce memory.]

033A	38	SEC		
033B	AD 7D 02	LDA	637	Loads tape header from first program and subtracts 4
033E	E9 04	SBC IM	4	
0340	8D F2 03	STA	1010	
0343	AD 7E 02	LDA	638	
0346	E9 00	SBC IM	0	
0348	8D F3 03	STA	1011	
034B	60	RTS		
034C	AD F2 03	LDA	1010	Combines old tape header with new header & checks the length of pgm to see if its too long
034F	8D 7B 02	STA	635	
0352	AD F3 03	LDA	1011	
0355	8D 7C 02	STA	636	
0358	38	SEC		
0359	AD 7D 02	LDA	637	
035C	EA	NOP		
035D	EA	NOP		
035E	A8	TAY		
035F	AD 7E 02	LDA	638	
0362	E9 04	SBC IM	4	
0364	AA	TAX		
0365	98	TYA		
0366	18	CLC		
0367	6D F2 03	ADC	1010	
036A	8D 7D 02	STA	637	
036D	8A	TXA		
036E	6D F3 03	ADC	1011	
0371	8D 7E 02	STA	638	
0374	38	SEC		
0375	AD 7D 02	LDA	637	
0378	ED 86 00	SBC	134	
037B	AD 7E 02	LDA	638	
037E	ED 87 00	SBC	135	
0381	10 0D	BPL	13	

0383	20 4D F6	JSR	63053	Starts loading of 2nd pgm if enough RAM is available
0386	20 22 F4	JSR	62498	
0389	20 8A F8	JSR	63626	
038C	20 EE F3	JSR	62446	
038F	00	BRK		
0390	A9 CE	LDAIM	206	
0392	A0 03	LDYIM	3	
0394	20 27 CA	JSR	51751	Go to message that combined the program is too long for the available RAM
0397	00	BRK		
0398	60	RTS		
039A	20 54 4F	JSR	20308	
039E	20 54 4F	JSR	20308	
03A1	20 4D 45	JSR	17741	
03A6	45 20	EORZ	32	
03A8	00	BRK		
03A9	60	RTS		
03AC	96 89	STXZY	137	
03AE	0A	ASLA		
03B2	38	SEC		
03B3	AD 7D 02	LDA	637	
03B6	ED 86 00	SBC	134	
03B9	AD 7E 02	LDA	638	
03BC	ED 87 00	SBC	135	
03BF	30 05	BMI	5	
03C1	20 4D F6	JSR	63053	
03C4	60	RTS		
03C5	A9 86	LDAIM	134	
03C7	A0 03	LDYIM	3	
03C9	20 03 20	JSR	8195	
03CD	CA	DEX		
03CF	48	PHA		
03D0	49 53	EORIM	83	Message
03D2	20 50 52	JSR	21072	
03D8	41 4D	EORIX	77	
03DA	20 41 53	JSR	21313	
03DD	20 54 4F	JSR	20308	
03E1	20 4C 4F	JSR	20300	
03E4	4E 47 20	LSR	8263	Old header stored in 3F2 & 3F3
03E9	20 4D 45	JSR	17741	
03EE	45 20	EORZ	32	
03F0	00	BRK		
03F1	60	RTS		

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PET Renumber 3.0

Bill Sellar

PET Renumber occupies 384 bytes at the end of an 8K PET RAM memory. The POKE 134,128 and POKE 135,30 statements set the top end of PET BASIC working memory below the PET Renumber routine. This protects Renumber from BASIC.

The SYS7808 transfers control to the PET Renumber Program.

The program uses the 1K of screen memory as a storage buffer for the old line numbers. It first copies the old line numbers to the screen buffer. On this first pass PET Renumber generates the new line numbers and inserts them at the beginning of each line.

On the second pass PET Renumber fixes the THEN, GOTO, GOSUB, and RUN line number references. It looks for these tokens followed by an ASCII number. If there is a number, it searches the old line number in the screen buffer and generates its new number. If the number is found, the new number is inserted after the token.

If the new line number is smaller or larger than the old, the source is appropriately expanded or compressed one byte at a time from the point where the new number is inserted.

After the second pass is completed, PET Renumber goes into a routine to fix line links, then goes back into BASIC.

Limitations:

PET Renumber uses the 1K TV screen RAM as a buffer. Old line numbers take two bytes each, thus the screen buffer can only hold 511 old line numbers. Also, the routine occupies 384 bytes of the 7167 bytes free to the user. This limits the size of the program after renumbering to 6783 bytes.

LOAD PET RENUMBER

TYPE NEW

POKE 134,128: POKE 135,30

LOAD the program to be renumbered

TYPE SYS 7808

When the cursor returns your program is renumbered starting at 100 step by 10.

To change the start numbers:

POKE 7809,LLL Lo BYTE Start # in

POKE 7813,HHH Hi BYTE 2 byte binary

To change the step sizes:

POKE 7817,SSS step size < 256

THEN, GOTO, GOSUB, RUN, ON X GOTO, and ON X GOSUB will be renumbered.

Branches to non-existent line numbers will be converted to branches to line number 65535 (an illegal line number).

Save PET Renumber with:

LOAD PET RENUMBER

LOAD and RUN Machine Language Monitor

TYPE .S 01,PET RENUMBER,1E80,2000

Direct Cursor Positioning/Animation in BASIC

John Bell McLean, VA

Rather than incrementally stepping the cursor to some X,Y coordinate on the screen, direct cursor positioning (placing it there in one operation) is a preferred method of plotting or animating your PET. After many hours of experimenting I developed the following DCP routine.

POKE 245,Y: PRINT "cu"; TAB(X); X;

where X is the character or string to be printed. Note that the Y coordinate (vertical) must be set first, and a PRINT"cu" statement is required before the TAB instruction. The PRINT following the POKE resets the cursor location, otherwise it causes a print after the previous cursor position and then resets the location.

SYMBOL TABLE

SYMBOL VALUE

AAAA	1FF9	ADDSTP	1FCA
BEGNUM	0064	BRTS	1FEA
CHPGT	00C2	CHPGOT	00C8
CDP20	1EA1	CDP80	1EC3
FACT0	00B1	FINI	C430
FN10	1F45	FN20	1F55
FOUT	DCAF	GP10	1FF3
INDEX1	0071	INDEX2	0073
MD10	1F96	MD20	1FA2
MD40	1FAF	MOVDWN	1F93
MU20	1F86	MU40	1F88
RENH	1ECB	RN10	1ED5
RN30	1EE6	RN35	1EE9
RN50	1EF8	RN60	1F13
RN75	1F2A	RN78	1F2C
SETFAC	1FC1	SETPTR	1FB0
STEP	004D	TOKEN	1FF6
VARTAB	007C		

ARTS	1FD5	BEGIN	004E
BUPX1	1FE4	BUPX2	1FE1
CNPX	1FD6	CDP10	1E9F
CDPNUM	1E8C	CRTS	1FE0
FINUM	1F3A	FLOATC	DB18
FN50	1F62	FN60	1F69
GPAB	1FEB	INCNUM	000A
LINGET	C863	LINNUM	0008
MD30	1FA7	MD35	1FAD
MOVUP	1F71	MU10	1F74
MU60	1F8E	NUMX	0050
RN15	1ED9	RN20	1EE0
RN40	1EEC	RN45	1EEE
RN65	1F21	RN70	1F27
RN80	1F34	SCREEN	8000
SS	7FFE	START	1E80
TXTPTR	00C9	TXTTAB	007A

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3.0 PET RENUMBER.....PAGE 0001

```

LINE # LOC  CODE  LINE
0002 0000      1 *****
0003 0000      1
0004 0000      1
0005 0000      1  RENUMBER PET BASIC
0006 0000      1
0007 0000      1  (C) COPYRIGHT 1978
0008 0000      1  BY B. SEILER
0009 0000      1  ALL RIGHTS RESERVED
0010 0000      1
0011 0000      1
0012 0000      1 *****

0014 0000      1 BEGNUM=100
0015 0000      1 INCHUM=10
0016 0000      1 VAPTR=$007C
0017 0000      1 FACT0=$00B1
0018 0000      1 LINUM=$0009
0019 0000      1 TXTPTR=$007A
0020 0000      1 TXTPTR=$00C9
0021 0000      1 INDEX1=$0071
0022 0000      1 INDEX2=$0073
0023 0000      1 STEP=$004D
0024 0000      1 BEGIN=$004F
0025 0000      1 NUMX=$0050
0026 0000      1 SCREEN=$8000

0028 0000      1 ***** BASIC SUBROUTINES *****
0029 0000      1 CHGET=$00C2      1 GETS CHR FROM TEXT
0030 0000      1 CHPGOT=$00C8      1 GET LAST CHAR
0031 0000      1 FINI=$0430      1 FIXES LINE LINKS
0032 0000      1 LINGET=$0063      1 MAKES ASCII INTO BIN
0033 0000      1 FLDATC=$001B      1 FLDAT A BIN #
0034 0000      1 FOUT=$00AF      1 MAKE ASCII

0036 0000      1 *****
0037 0000      1
0038 0000      1
0039 0000      1  RENUMBER BASIC LINES
0040 0000      1  STARTS AT BEGNUM
0041 0000      1  AND NUMBERS BY INCHUM
0042 0000      1  ALSO RENUMBERS THEN'S,RUN'S,
0043 0000      1  GOTO'S AND GOSUB'S,
0044 0000      1  INCLUDING ON XX GOTO AND
0045 0000      1  ON XX GOSUB STATEMENTS
0046 0000      1
0047 0000      1  ENTER BY SYS(7808),
0048 0000      1  RETURNS TO BASIC
0049 0000      1
0050 0000      1

```

3.0 PET RENUMBER.....PAGE 0002

```

LINE # LOC  CODE  LINE
0051 0000      1  DEFAULT 1
0052 0000      1  FIRST LINE NUMBER = 100
0053 0000      1  STEP BY 10
0054 0000      1
0055 0000      1  FOR DIFFERENT START NUMBER
0056 0000      1  POKE 7809,XXX LD BYTE
0057 0000      1  PE 7813,X HI BYTE
0058 0000      1
0059 0000      1  FOR A DIFFERENT STEP
0060 0000      1  POKE 7817,XXX STEP SIZE <256
0061 0000      1
0062 0000      1
0063 0000      1 *****

0065 0000      1 **=$1E80
0066 1E80
0067 1E80 A9 64      1 START LDA #BEGNUM      1 DEFAULT START
0068 1E82 85 4E      1 STA BEGIN      1 AT 100
0069 1E84 A9 00      1 LDA #BEGNUM
0070 1E86 85 4F      1 STA BEGIN+1
0071 1E88 A9 0A      1 LDA #INCHUM      1 STEP BY 10
0072 1E8A 85 4D      1 STA STEP

0074 1E8C      1 IFILL SCREEN BUFFER WITH OLD
0075 1E8C      1 LINE NUMBERS AND RENUMBER
0076 1E8C      1 THE BEGINNINGS ONLY
0077 1E8C      1
0078 1E8C      1 SS=SCREEN-2
0079 1E8C A9 FE      1 COPNUM LDA #SS      1 SCREEN PTR - 2
0080 1E8E 85 73      1 STA INDEX2
0081 1E90 A9 7F      1 LDA #SS
0082 1E92 85 74      1 STA INDEX2+1
0083 1E94 A5 7A      1 LDA TXTPTR      1 BEGINING OF TEXT
0084 1E96 85 71      1 STA INDEX1
0085 1E98 A5 7B      1 LDA TXTPTR+1
0086 1E9A 85 72      1 STA INDEX1+1
0087 1E9C 20 C1 1F      1 JSR SETFAC      1 SET NEW # CTR
0088 1E9F A0 03      1 COP10 LDY #3      1 POINT AT LINE #
0089 1EA1 B1 71      1 COP20 LDA (INDEX1),Y      1 GET LINE #
0090 1EA3 91 73      1 STA (INDEX2),Y      1 SAVE IN BUFFER
0091 1EA5 B9 AE 00      1 LDA FACT0-3,Y      1 GET NEW #
0092 1EA8 91 71      1 STA (INDEX1),Y      1 REPLACE OLD
0093 1EAA 88
0094 1EAB C0 01      1 CPY #1      1 POINTING AT LINK?
0095 1EAD D0 F2      1 BNE COP20      1 NO-LOOP
0096 1EAF B1 71      1 LDA (INDEX1),Y      1 YES-LAST LINE?
0097 1EB1 F0 10      1 BEQ COP80      1 YES-DONE!
0098 1EB3 20 E1 1F      1 JSR BUMP2      1 NO-BUMP PTR 2
0099 1EB6 AA      1 TAX      1 SAVE HI LINK IN X
0100 1EB7 88      1 DEY      1 POINT TO LO LINK
0101 1EB8 B1 71      1 LDA (INDEX1),Y      1 GET LOW

```

LINE #	LOC	CODE	LINE
0102	1F8A	A5 71	STA INDEX1
0103	1F8C	A5 72	STX INDEX1+1
0104	1F8E	2A CA 1F	JSR ADDSTP
0105	1EC1	D0 DC	BNE COP10
0106	1EC3		
0107	1EC3	A9 FF	COP80 LDA #1FF
0108	1EC5	C8	INY
0109	1EC6	91 73	STA (INDEX2),Y
0110	1EC8	C8	INY
0111	1EC9	91 73	STA (INDEX2),Y
0112	1ECB	A5 7A	PENN LDA TXTTAB
0113	1ECD	A5 C9	STA TXTPTR
0114	1EEF	A5 7B	LDA TXTTAB+1
0115	1ED1	A5 CA	STA TXTPTR+1
0116	1ED3	D0 03	BNE RN15
0117	1ED5	20 EB 1F	JSP GRAB
0118	1ED8	20 EB 1F	RN15 JSP GRAB
0119	1ED8	D0 03	BNE RN20
0120	1EDD	4C 30 C4	JMP FIN1
0121	1EE0	20 EB 1F	RN20 JSP GRAB
0122	1EE3	20 EB 1F	JSP GRAB
0123	1EE6	20 EB 1F	RN30 JSP GRAB
0124	1EE9	AA	RN35 TAX
0125	1EEA	F0 E9	BEQ PN10
0126	1EEC		
0127	1EEC	A2 04	RN40 LDX #4
0128	1FEE	D0 F5 1F	RN45 CMP TOKEN-1,X
0129	1EF1	F0 05	BEQ PN50
0130	1EF3	CA	DEX
0131	1EF4	D0 F8	BNE RN45
0132	1EF6	F0 EE	BEQ PN30
0133	1EF9	A5 C9	RN50 LDA TXTPTR
0134	1EFA	48	PHA
0135	1EFB	A5 CA	LDA TXTPTR+1
0136	1EFD	48	PHA
0137	1EFE	20 C2 00	JSP CHGET
0138	1F01	B0 E6	BCC RN35
0139	1F03	20 63 C8	JSP LINGET
0140	1F06	20 3A 1F	JSP FINUM
0141	1F09	6A	PLA
0142	1F0A	A5 CA	STA TXTPTR+1
0143	1F0C	69	PLA
0144	1F0D	A5 C9	STA TXTPTR
0145	1F0F	A0 00	LDY #0
0146	1F11	A2 00	LDX #0
0147	1F13	B0 01 01	RN60 LDA \$0101,X
0148	1F16	F0 0F	BEQ RN70
0149	1F18	48	PHA
0150	1F19	20 C2 00	JSP CHGET
0151	1F1C	9A 03	BCC RN65
0152	1F1E	20 71 1F	JSP MOVUP
0153	1F21	6A	PLA
0154	1F22	91 C9	STA (TXTPTR),Y
0155	1F24	E9	INX
0156	1F25	D0 EC	BNE RN60

LINE #	LOC	CODE	LINE
0157	1F27	20 C2 00	RN70 JSP CHGET
0158	1F2A	B0 08	RN75 BCS RN80
0159	1F2C	20 93 1F	RN78 JSP MOVDMN
0160	1F2F	20 C8 00	JSP CHGET
0161	1F32	90 F8	BCC RN78
0162	1F34	C9 2C	RN80 CMP #1
0163	1F36	F0 C0	BEQ RN50
0164	1F38	D0 AF	BNE RN35
0166	1F3A		
0167	1F3A		
0168	1F3A		
0169	1F3A		
0170	1F3A		
0171	1F3A		
0172	1F3A		
0173	1F3A	20 C1 1F	FINUM JSP SETFAC
0174	1F3D	A2 00	LDA #SCREEN
0175	1F3F	A5 73	STA INDEX2
0176	1F41	A9 80	LDA #SCREEN
0177	1F43	A5 74	STA INDEX2+1
0178	1F45	A0 01	FN10 LDY #1
0179	1F47	B1 73	LDA (INDEX2),Y
0180	1F49	C5 09	CMP LINUM+1
0181	1F4B	F0 15	BEQ FN50
0182	1F4D	C9 FF	CMP #1FF
0183	1F4F	D0 18	BNE FN50
0184	1F51	A5 B1	STA FACTO
0185	1F53	A5 B0	STA FACTO-1
0186	1F55	A5 B0	FN20 LDA FACTO-1
0187	1F57	A5 B2	STA FACTO+1
0188	1F59	A2 90	LDX #190
0189	1F5B	38	SEC
0190	1F5C	20 1B DB	JSP FLOATC
0191	1F5F	4C AF DC	JMP FOUT
0192	1F62		
0193	1F62	88	FN50 DEY
0194	1F63	B1 73	LDA (INDEX2),Y
0195	1F65	C5 08	CMP LINUM
0196	1F67	F0 EC	BEQ FN20
0197	1F69	20 CA 1F	FN60 JSP ADDSTP
0198	1F6C	20 E1 1F	JSP BUXP2
0199	1F6F	D0 D4	BNE FN10
0201	1F71		
0202	1F71		
0203	1F71	20 B0 1F	MOVUP JSP SETPTR
0204	1F74	A0 00	LDY #0
0205	1F76	B1 71	LDA (INDEX1),Y
0206	1F78	C8	INY
0207	1F79	91 71	STA (INDEX1),Y

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Schedule Planner can be used by secretaries, receptionists, housewives or anyone wanting to plan and have at their fingertips their own schedule. Data entered is date, time, priority and description. The commands allow the schedule to be shown for a particular day, request of time or the "viewing" of appointments according to importance.

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Schedule Planner #2 includes all the features of Schedule Planner, but is used for one or more individuals. Utilizing Schedule Planner #2 a customer can call in asking when his appointment with Dr. Jones is and in seconds the receptionist can give the date and time. Or Dr. Jones can find out his schedule for the day. With the viewing command, an appointment at 12:00 on a particular day will display on the screen at that time allowing receptionists and secretaries to validate appointments.

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Especially designed with the small businessman in mind. Utilizing cassettes can record data for any number of employees (8 employees per cassette). Computes tax information and updates totals for quarterly and yearly reports. Employees can be salaried or hourly and pay periods can be either weekly, bi-weekly, semi-monthly or monthly.

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Business Graphic Pack 1 is a simple program to use, but professional in output. The graph includes title, labeling of axis, dual graphic ability, whether the data is in Mill's, 100's or 1000's, and an optional x-axis = date and labeling of the x-axis with month and year. Entry is as easy as typing the title, # of entries, the X,Y value (Jan. 15, 1978 would be entered as 115.78), entering if the x-axis = date, if the user wants crosshatching and then graphing. The program also includes Nth order and Geometric regression to give the user a formula for his set of data (if possible).

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CHECKBOOK RECONCILIATION —

Designed for ease of use and to find those troublesome checkbook errors, this program balances your checkbook and bank statement from month to month. It locates over ten different types of errors and instructs the user on correcting them, including bank statement errors made by your bank. Records data on cassette for next month's balancing - saving re-entry of figures.

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CALCULATOR —

Especially for the accountant-bookkeeper. This program not only allows your PET to function as a calculator, but also has such features as Lister (which verifies and displays errors between two tape listings) and Matrix (which adds columns vertically and horizontally).

\$10.00

All Programs include documentation, are in BASIC and on cassette.

*PET is a trademark of Commodore Business Machines, Inc.

Sawyer Software

201 Worley Road
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LINE #	LOC	CODE	LINE
0203	1F7B	20 D6 1F	JSR CMPX
0204	1F7E	D0 08	BNE MU40
0210	1F80	E6 7C	INC VARTAB
0211	1F82	D0 02	BNE MU20
0212	1F84	E6 7D	INC VARTAB+1
0213	1F86	88	DEY
0214	1F87	60	RTS
0215	1F88		
0216	1F88	A4 71	MU40 LDY INDEX1
0217	1F8A	D0 02	BNE MU60
0218	1F8C	C6 72	DEC INDEX1+1
0219	1F8E	C6 71	MU60 DEC INDEX1
0220	1F90	4C 74 1F	JMP MU10

0222	1F93		MOVES TEXT DOWN ONE BYTE
0223	1F93		
0224	1F93	20 B0 1F	MOVDWN JSR SETPTR
0225	1F96	A0 01	LDY #1
0226	1F98	B1 73	LDA (INDEX2)+Y
0227	1F9A	88	DEY
0228	1F9B	91 73	STA (INDEX2)+Y
0229	1F9D	20 D6 1F	JSR CMPX
0230	1FA0	F0 05	BEQ MD30
0231	1FA2	20 E4 1F	JSR BUX1
0232	1FA5	D0 EF	BNE MD10
0233	1FA7	A4 7C	LDY VARTAB
0234	1FA9	D0 02	BNE MD35
0235	1FAB	C6 7D	DEC VARTAB+1
0236	1FAD	C6 7C	MD35 DEC VARTAB
0237	1FAF	60	MD40 RTS

0239	1FB0		SETS PTRS FOR TEXT MOVES
0240	1FB0		
0241	1FB0	A5 7C	SETPTR LDA VARTAB
0242	1FB2	85 71	STA INDEX1
0243	1FB4	A5 7D	LDA VARTAB+1
0244	1FB6	85 72	STA INDEX1+1
0245	1FB8	A5 C9	LDA TXTPTR
0246	1FBA	85 73	STA INDEX2
0247	1FBC	A5 CA	LDA TXTPTR+1
0248	1FBE	85 74	STA INDEX2+1
0249	1FC0	60	RTS

0251	1FC1		SETS UP FACTO AND FACTO-1
0252	1FC1		TO GENERATE NEW LINE #'S
0253	1FC1		
0254	1FC1	A5 4E	SETFAC LDA BEGIN
0255	1FC3	85 B0	STA FACTO-1
0256	1FC5	A5 4F	LDA BEGIN+1

LINE #	LOC	CODE	LINE
0257	1FC7	85 B1	STA FACTO
0258	1FC9	60	RTS
0260	1FCA		ADDS STEP TO FACTO-1 AND FACTO
0261	1FCA		
0262	1FCA	A5 B0	ADJUST LDA FACTO-1
0263	1FCC	18	CLC
0264	1FCD	65 4D	ADC STEP
0265	1FCF	85 B0	STA FACTO-1
0266	1FD1	90 02	BCC ARTS
0267	1FD3	E6 B1	INC FACTO
0268	1FD5	60	ARTS RTS

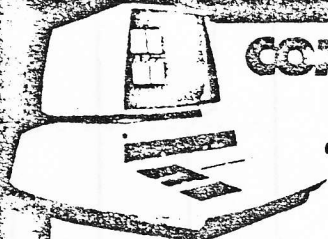
0270	1FD6		COMPARES INDEX1 AND INDEX2
0271	1FD6		ZERO FLAG SET IF EQUAL
0272	1FD6		
0273	1FD6	A5 71	CMPX LDA INDEX1
0274	1FDA	C5 73	CMP INDEX2
0275	1FDA	D0 04	BNE CRTS
0276	1FDC	A5 72	LDA INDEX1+1
0277	1FDE	C5 74	CMP INDEX2+1
0278	1FE0	60	CRTS RTS

0280	1FE1		INCREMENTS INDEX2 ONE OR TWO
0281	1FE1		
0282	1FE1	20 E4 1F	BUX2 JSR BUX1
0283	1FE4	E6 73	BUX1 INC INDEX2
0284	1FE6	D0 02	BNE BPTS
0285	1FE8	E6 74	INC INDEX2+1
0286	1FEA	60	BPTS RTS

0288	1FEB		GET A CHAR SET ZERO FLAG
0289	1FEB		
0290	1FEB	A0 00	GRAB LDY #0
0291	1FED	E6 C9	INC TXTPTR
0292	1FEF	D0 02	BNE GR10
0293	1FF1	E6 CA	INC TXTPTR+1
0294	1FF3	B1 C9	LDA (TXTPTR)+Y
0295	1FF5	60	RTS

0297	1FF6	89	TOKEN .BYTE \$89
0298	1FF7	8A	.BYTE \$8A
0299	1FF8	8D	.BYTE \$8D
0300	1FF9	A7	AAAA .BYTE \$A7
0301	1FFA		.END

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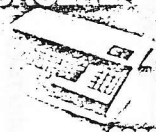


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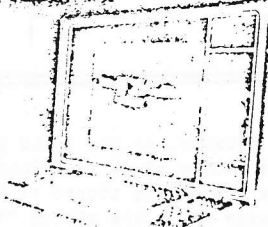
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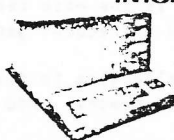


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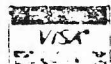
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MC

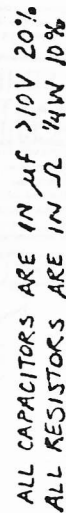
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By Jim Butterfield Toronto

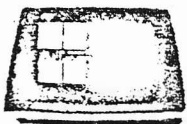
Note that X₁ doesn't show up there; it's used directly out of your BASIC program and doesn't need to be stored again.

You'll see that the new value of A\$ ("GOODBYE") has been repacked into the top of memory. You may see part of the old strings below, but they will be written over when the space is used again.

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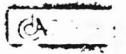
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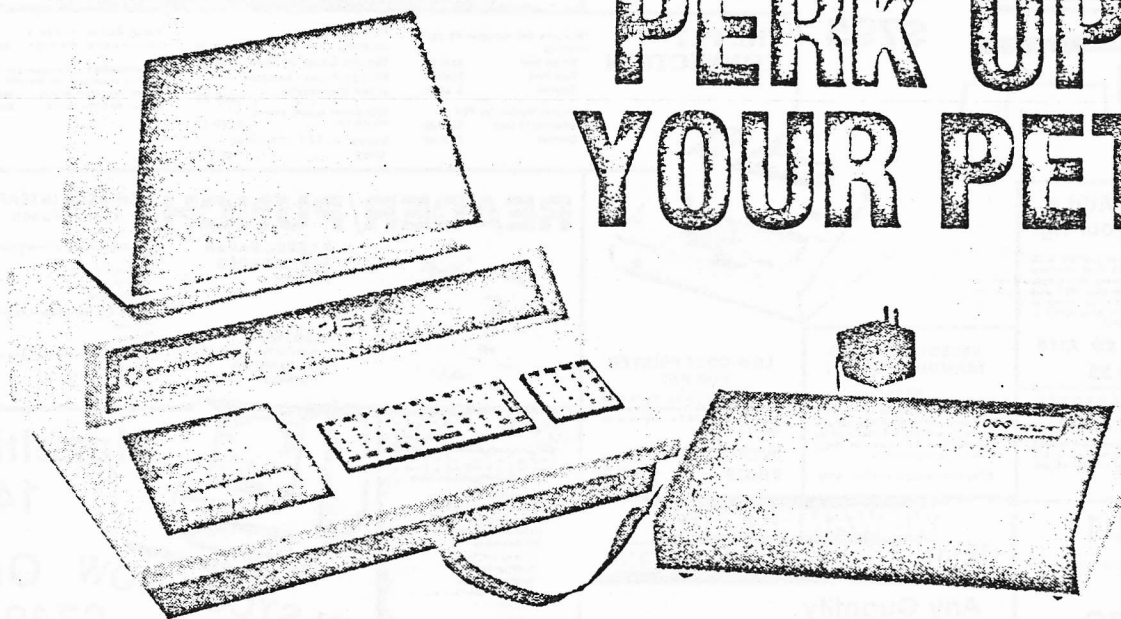
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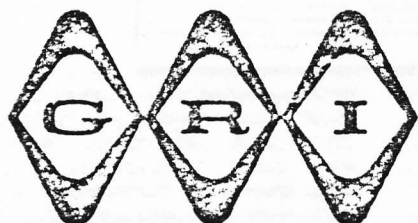
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Panic Button

Michael Riley Philadelphia

Load this program, type RUN100, then SYS826 to initialize it. If you lose the cursor because of an endless machine language loop, you can regain control by pressing the ! and # keys simultaneously.

To test "Panic Button" type SYS869. This is an endless loop at the end of the program. Press ! and # to exit the loop and regain control. SYS826 will reactivate the program.

If this program is used with a Monitor, the Program Counter and registers will be displayed by the Monitor when you press ! and #. Of course, the loop may have damaged your program beyond recognition, but at least you have a chance to find out what went wrong.

The program sits in the 2nd cassette buffer. To relocate it, the bytes that are now at 033C and 0342 must be changed so they point to the routine that now starts at 0349.

To save with monitor: .S 01,PANIC,033A,0368

```

51 -033A 78 SEI MAKE HDWR
52 -033B A9 49 LDAN (49) INT VECT
53 -0330 8D 19 02 STA 0219 POINT TO
54 -0340 EA NOP TEST ROU-
55 -0341 A9 03 LDAN (03) TIME
56 -0343 8D 1A 02 STA 021A
57 -0346 5B 60 CLI RTS NOP
> 58 -0342 A9 F0 LDAN F0 TEST FOR ! AND #
59 -034B 8D 10 E8 STA E810 KEY. IF NO
60 -034E AD 12 E8 LDA E812 THEN ON TO
61 -0351 C9 FD CMP# FD NORM HDWR
62 -0353 F0 03 BEQ 0358 INT. IF YES
63 -0355 4C 85 E6 JMP E685 THEN RESTORE
64 -035B A9 85 LDAN 85 HW VECTOR
65 -035A 8D 19 02 STA 0219 AND JMP
66 -035D A9 E6 LDAN E6 THROUGH
67 -035F BD 1A 02 STA 021A BRK
68 -0362 6C 1B 02 JMPI 021B VECTOR.
69 -0365 4C 65 03 JMP 0365 <TEST LOOP
70 :
100 FORX=826T0J7i:READR:POKEX,R:NEXT
826 DATA 120,169,73,141,25,2,234,169,3,141,26,2,88
841 DATA 96,234,169,240,141,16,232,173,18,232,201
850 DATA 252,240,3,76,133,230,169,133,141
856 DATA 25,2,169,230,141,26,2,108,27,2,76,101,3

```

Decimal to Hex Conversion - 4 Lines

Mr. Kim Clark, Anaheim CA

```

1 A$="0123456789ABCDEF":INPUT"DEC/HEX";A:B=1
2 C=9:D=16:C:PRINT"U"A*1 = ";A=A+1
3 IF A-D>0 THEN A=A-D:B=B+1:GOTO2
3 PRINT MID$(A$,B,1);B=1:C=C-1:D=16:C:IF C>-1
GOTO2
4 PRINT " :GOTO1
READY.

```

REQUESTS

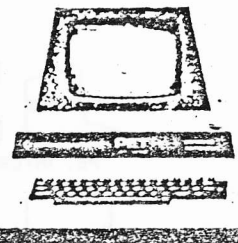
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New Discovery ?

Even at this late date there are still some surprises hidden in your PET. Frank Chambers writes from Ireland to suggest that you input one of these lines and then call for a listing. ("s" means SPACE key; "-" means SHIFTEd character.)

4502sREM, *Bs/s(s*B+N:4

11234sREM, \$=/Zp? \$Y\$?+)s;! "B'U

A One Line BASIC Program

Henry Chow, Detroit

```

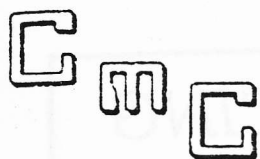
100 F=826:L=841:FORN=1000T01011:PRINTN;"DATA";
200 FORP=FTOL:PRINTPEEK(P):"cursor left";:NEXTP
300 PRINT:F=L+1:L=L+16:NEXTN:END

```

[ed. note: some of you might question the the phrase 'One Line' in the title. Henry sent the routine as one line using PET BASIC abbreviations. I changed it to 3 lines for convenient listing. The program converts machine language code in the second cassette buffer area into DATA statements.]

MISCELLANEOUS

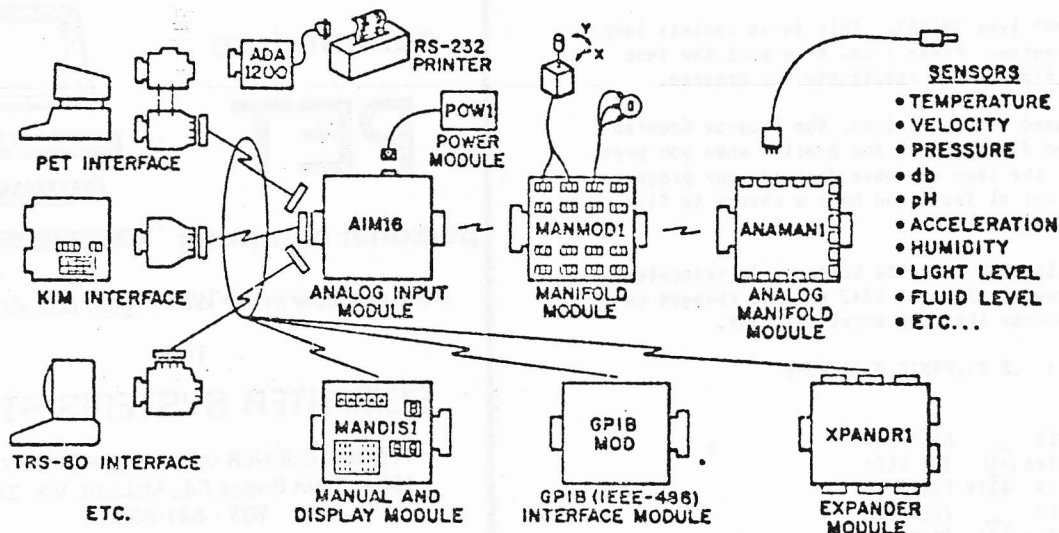
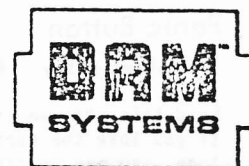
Stan Klein, Joint Science Dept, Claremont Colleges, Claremont CA 91711 is interested in contacting people interested in simulations in biology, chemistry, physics, and psychology at the college level.



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MANMOD1 - Manifold Module Use in place of ICON. 16 3-screw terminal barrier strips for connecting joysticks, potentiometers, voltage sources, etc. Eliminates the need for soldering. Plugs into the AIM16.	TBA
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SENSORS Sensors for temperature, pressure, flow, humidity, level, pH, motion, etc.	TBA
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GPIB MOD - GPIB (IEEE-488) Interface Module Allows the DAM SYSTEMS MODULES to be used with the GPIB bus instead of a computer's other I/O ports.	TBA
XPANDR1 - Expander Module Allows up to 128 8-bit analog inputs (8 AIM16 Modules) to be connected to one system.	TBA

Introducing

TANKTICS

If you've gotten tired of playing children's games on your PET, consider TANKTICS, the most sophisticated computer game available.

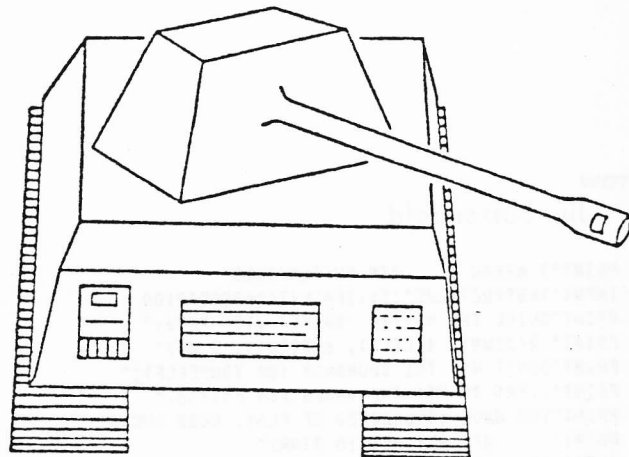
TANKTICS is a computer game which simulates armored combat during World War II. You command a force of up to ten tanks; your mission is to take and hold an assigned objective. Opposing you is the PET itself, armed with twice as many tanks as you have. The PET's tanks are just as fast and powerful as your own, so to win you must maneuver your tanks more shrewdly than PET. This isn't easy---PET's sophisticated software allows PET to play a very good game. To beat PET, you must carefully judge the effects of terrain, range, and individual tank facing as you plan your move. You must consider and utilize the element of surprise, for you do not know the position of an enemy tank unless one of your tanks can see it. TANKTICS is a "think" game rather than an "action" game, so you have all the time you need to plan your move. In sum, TANKTICS provides a tense and challenging game that can be played many times without losing its richness.

With each game of TANKTICS, you get: 1) tape cassette containing TANKTICS program in two segments (1.4K machine language segment and 5K BASIC segment); 2) 31 playing counters; 3) 17" x 22" map depicting the battlefield; 4) 8 page player's manual explaining how to play and giving tactical hints.

TANKTICS is now available for shipment. To order, send check or money order for \$15.00 (Calif residents add 6% sales tax) to:

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Please allow one to three weeks for personal checks to clear the bank.



Arrow

Jim Butterfield

```
10 PRINT "3 ARROW 2 JIM BUTTERFIELD"
20 INPUT "INSTRUCTIONS"; Z$: IF ASC(Z$) = 78 GOTO 100
30 PRINT "GUIDE THE MOVING 'SNAKE' WITH KEYS:"
40 PRINT " 2(DOWN), 4(LEFT), 6(RIGHT), 8(UP)"
50 PRINT "DON'T HIT THE BOUNDARY (OR YOURSELF);"
60 PRINT "..TRY TO HIT THE BOXES FOR POINTS."
70 PRINT "YOU HAVE 60 SECONDS OF PLAY. GOOD LUCK!"
80 PRINT " HIT ANY KEY TO START"
90 GET Z$: IF Z$ = "" GOTO 90
100 DIM P(80), D(3)
110 D(0) = 22: D(1) = 60: D(2) = 62: D(3) = 30
120 T9 = 32768: T6 = 3599: POKES9468, 12
130 M1 = 59467: M2 = 59466: M3 = 59464
140 PRINT "cs SCORE: 0"
150 FOR J = 32808 TO 32847: POKE J, 81: POKE J + 920, 81: NEXT J
160 FOR J = 32848 TO 33728: STEP 40: POKE J, 81: POKE J + 39, 81: NEXT J
170 V = 20: H = 35: V1 = 0: H1 = -1: P2 = 10: D1 = 1
180 TI$ = "000000"
190 PRINT "hone"; RIGHT$(TI$, 2): IF TI > T6 GOTO 480
200 GET Z$: IF Z$ = "" GOTO 230
210 Z = (ASC(Z$) - 50) / 2: IF Z < 0 THEN Z = 0: IF Z > 3 GOTO 230
220 D1 = Z: D = Z - 1.5: V1 = INT(ABS(D)) * SGN(D): H1 = SGN(D) - V1
230 V = V - V1: H = H + H1
240 P = 32768 + V * 40 + H
250 P9 = PEEK(P): POKEM1, 16: POKEM3, 29 * D1 + 80: POKEM2, 15
260 R6 = R7: R7 = R7 + 1: IF R7 > P2 THEN R7 = 0
270 P1 = P(R7): P(R7) = P: POKEM1, 0: IF P1 < 0 THEN POKE P1, 32
280 POKE P, D(D1): P1 = P(R6): IF P1 < 0 THEN POKE P1, 81
```

```
290 IF P9 < 32 GOTO 400
300 IF RND(1) > .05 GOTO 190
310 FOR V3 = V2 - 1 TO V2 + 1: P3 = V3 * 40 + T9: FOR H3 = H2 - 1 TO H2 + 1: IF PEEK(P3 + H3) < 102 GOTO 330
320 POKE P3 + H3, 32
330 NEXT H3, V3: T = 0: POKE P8, 32
340 V2 = INT(RND(1) * 20) + 3: H2 = INT(RND(1) * 36) + 2
350 FOR V3 = V2 - 1 TO V2 + 1: P3 = V3 * 40 + T9: FOR H3 = H2 - 1 TO H2 + 1: IF PEEK(P3 + H3) < 32 GOTO 340
360 NEXT H3, V3: FOR V3 = V2 - 1 TO V2 + 1: P3 = V3 * 40 + T9: FOR H3 = H2 - 1 TO H2 + 1: POKE P3 + H3, 0
370 POKE M1, 16: POKE M2, 15: POKE M3, 30
380 POKE P3 + H3, 102: POKE M1, 0
390 NEXT H3, V3: T = 9 * RND(1): P8 = V2 * 40 + H2 + T9: POKE P8, 49 + T: GOTO 190
400 IF P9 < 102 GOTO 460
410 T$ = TI$
420 T = T - 1: S = S + 1: POKE P8, T + 49: POKE M1, 16: POKE M2, 15
430 PRINT "hone + 9 cursor right"; S
440 FOR J = 100 TO 30: STEP -1: POKE M3, J: NEXT J: POKE M1, 0: IF T > 0 GOTO 420
450 P2 = P2 + 1: TI$ = T$: GOTO 310
460 POKE M1, 16: POKE M2, 15: POKE M3, 200: FOR J = 1 TO 1000: NEXT J
470 POKE M1, 0
480 PRINT "ANOTHER GAME?2 ===";
490 GET Z$: IF Z$ = "" GOTO 490
500 IF Z$ = "Y" THEN CLS: GOTO 100
510 IF Z$ < "N" GOTO 490
520 PRINT "3";
```

ed. note: this program uses sound.
If you have not already done so, get an edge connector for the parallel port and hook up an audio amplifier using pins CB2 and Ground. If you do not have an amplifier, an inexpensive choice would be a Radio Shack 'Micro-Sonic' speaker-amplifier for \$10.95.

PET User Group
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